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miles in diameter, it is not probable that any of them are not warm enough, or possess atmosphere enough, to sustain life.

In the whole solar system, then, we find but one planet, *Mars*, on which the physical conditions seem to be suited to life like our own, and even there our constitutions would have to be considerably modified. Some of the satellites of *Jupiter* and *Saturn* may also, perhaps, be habitable, but of the condition of these we have almost no positive knowledge.

But how about the stars? Among the thousands, millions, and hundreds of millions of glittering orbs which the great telescopes reveal, are there no inhabited worlds? We can say of each one of these, which is visible to the eye or which the telescope reveals, that it is a sun, an intensely hot, glowing body, shining by its own light and therefore not an inhabitable world. How many satellites or planets there are, circling invisible around the stars, we can only infer by analogy, and we can only infer, again by analogy, that among the myriads of these invisible satellites there may be millions of worlds like our own.

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## PLANETARY PHENOMENA, MAY AND JUNE, 1911.

BY MALCOLM MCNEILL.

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### PHASES OF THE MOON, PACIFIC TIME.

First Quarter..	May 5, 5 <sup>h</sup> 14 <sup>m</sup> A.M.	First Quarter..	June 3, 2 <sup>h</sup> 4 <sup>m</sup> P.M.
Full Moon ...	" 12, 10 10 P.M.	Full Moon ...	" 11, 1 51 P.M.
Last Quarter .	" 21, 1 23 A.M.	Last Quarter..	" 19, 12 51 P.M.
New Moon ..	" 27, 10 24 P.M.	New Moon ..	" 26, 5 20 A.M.

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The Sun reaches the summer solstice and its point of greatest north declination on June 22d at 5 A. M. Pacific time.

*Mercury* is an evening star at the beginning of May, but too near the Sun for observation. It passes inferior conjunction on May 5th and becomes a morning star. It reaches its greatest west elongation on June 1st. From that date it draws nearer to the Sun and by the end of the month has nearly reached superior conjunction. As a rule west elongations of *Mercury* do not afford a good opportunity for viewing the planet. But the present greatest west elongation, 24° 30', is

rather larger than the average, so that during the first half of June the planet is above the horizon an hour or more before sunrise and may therefore be seen if the weather conditions are favorable.

*Venus* remains as an evening star, setting rather more than three hours after sunset throughout May. This interval shortens to about two hours and forty minutes during June on account of the relatively greater motion southward of *Venus* as compared with the Sun. The apparent distance between planet and Sun continues to increase until July 7th, the date of greatest east elongation. During the two months *Venus* moves  $72^\circ$  eastward and  $9^\circ$  southward from *Taurus* through *Gemini* and *Cancer* nearly to the western border of *Leo*, not far from *Regulus*,  $\alpha$  *Leonis*.

*Mars* rises at about 2:30 A. M. on May 1st and at about 12:30 A. M. on June 30th. It moves about  $41^\circ$  eastward and  $16^\circ$  northward from a point in the constellation *Aries* nearly through *Pisces*. On June 1st it passes about  $2^\circ$  south of the vernal equinox. No bright stars are near its path. Its distance from the Earth diminishes from 141,000,000 to 108,000,000 miles and its brightness increases from one eighth to nearly one quarter of the brightness it will have at opposition next November. It is therefore getting to be fairly conspicuous, and there will be no difficulty in identifying it.

*Jupiter* passed opposition with the Sun on the last day of April, and is therefore above the horizon on May 1st practically the entire night. It sets about four minutes earlier each night, so that by the end of June it sets about 1 A. M. It is retrograding (moving westward) in the constellation *Libra*, the whole movement being about  $6^\circ$  westward and  $1^\circ$  northward. The westward motion nearly ceases before the end of June. The Moon will pass just south of *Jupiter* on the evening of June 7th. In fact, for regions far south of the equator the planet will be occulted by the Moon on that evening.

*Saturn* passed conjunction with the Sun on April 30th and became a morning star, but remains too near the Sun for naked-eye visibility until nearly the end of May. It then rises an hour or more before sunrise. This interval increases by the end of June to about three hours, the planet then rising

shortly after half-past one. *Saturn* is in the eastern part of *Aries*, and during the two months moves  $7^{\circ}$  eastward and  $2^{\circ}$  northward, being not far from the *Pleiades* group in *Taurus* by the end of June. The appearance of the rings is about the same as it was before conjunction, the minor axis being about one third the width of the major, and somewhat less than the diameter of the planet.

*Uranus* rises shortly before 1 A. M. on May 1st and shortly before 9 P. M. on June 30th. Owing to its faintness it is not worth while to look for it until about two hours or so after it has risen, and just now there are no bright stars near enough to it to make identification easy. It is in the western part of the constellation *Capricornus* and moves  $1^{\circ}$  westward and a little southward during the month.

*Neptune* sets at about midnight on May 1st and shortly after 8 P. M. on June 30th. It is in the constellation *Gemini* south of *Castor* and *Pollux*.

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(SIXTY-NINTH) AWARD OF THE DONOHUE  
COMET-MEDAL.

The Comet-Medal of the Astronomical Society of the Pacific has been awarded to the Rev. JOEL METCALF, of Taunton, Massachusetts, for the discovery of an unexpected comet on August 10, 1910.

Committee on the Comet-Medal:

W. W. CAMPBELL,  
S. D. TOWNLEY,  
H. D. CURTIS.

SAN FRANCISCO, December 7, 1910.